



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/733,272	12/12/2003	Chia-Shang Chen	BHT-3183-62	8248

7590 08/16/2005  
TROXELL LAW OFFICE PLLC  
SUITE 1404  
5205 LEESBURG PIKE  
FALLS CHURCH, VA 22041

EXAMINER

DEO, DUY VU NGUYEN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 08/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/733,272

Applicant(s)

CHEN ET AL.

Examiner

DuyVu n. Deo

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/12/03.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 17, 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Kang et al. (US 6,582,616).

Kang describes a method for forming a BGA comprising: providing a CCL board (claimed substrate) having a top and bottom surface, the top surface including a die-cavity region; forming a plurality of linear slots around the die-cavity region to form a die-cavity portion integrally connected with the substrate within the die-cavity region; forming a copper film on the substrate and in the slots; removing the die-cavity region to form an inner hole (this would connect the slots in manner that the die-cavity portion is separated from the substrate (fig. 4; col. 6, line 28-35).

### ***Claim Rejections - 35 USC § 102 and 35 USC § 103***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for

Art Unit: 1765

patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 5, 9, 12, 13 are rejected under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C 103(a) as obvious over Kang et al. (US 6,582,616).

Kang, as described above, is silent about forming, patterning an anti-etching layer on the metal layer, which is etched under the anti-etching layer and the metal layer on the sidewalls of the slots are protected by the anti-etching layer. However, Kang describes a series of step including exposure, developing, and etching to form a circuit and figure 4 shows the metal layer 20 on the sidewalls of the slots are not etched. Therefore, an anti-etching layer must be used so that the metal layer can be patterned on the substrate and protected on the sidewalls. In alternative, it would have been obvious for one skilled in the art to use an anti-etching layer in order to pattern the metal layer while protecting it from be etched on the sidewalls as shown in figure 4 by Kang.

6. Claims 3, 6-8, 11, 14-16, 18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang.

Unlike claimed invention, Kang doesn't describe the slots are L-shaped slots or the slots having a width between 0.1-4.0 mm. However, at the time of the invention, using any shape of the slots would be obvious and the slots width would have to be determined through routine

Art Unit: 1765

experimentation to obtain optimum width to form an inner hole with a reasonable expectation of success.

Referring to claims 7, 8, 15, and 16, forming an insulating layer and a surface treating layer on the circuit pattern or metal layer are well known steps to one skilled in the art during the fabrication of BGA (please see cited art below).

7. Claims 2, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang as applied to claims 1 and 9 above, and further in view of Wolf et al. (Silicon Processing for the VLSI Era).

Kang doesn't describe the anti-etching layer is a photosensitive dry film. However, he describes the process including exposure, developing and etching, which are known to one skilled in the art as the steps of using a photoresist (claimed photosensitive dry film) as shown here by Wolf (pages 407-408). Therefore, at the time of the invention, one skilled in the art would find it obvious in light of Wolf to use the photoresist because it is the material that is processed by the steps suggested by Kang.

8. Kalidas et al. (US 6,084,777) is used to show prior art (col. 1, line 60; col. 5, line 23-26).

9. Mertol (US 5,834,839) is used to show prior art (col. 4, line 58-61).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n. Deo whose telephone number is 571-272-1462. The examiner can normally be reached on 6:00-2:30 Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571-272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 1765

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

\*Primary Examiner

Duy-Vu N. Deo

8/11/05

